### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

### (19) World Intellectual Property Organization

International Bureau



## 

# (43) International Publication Date 3 June 2004 (03.06.2004)

### **PCT**

# (10) International Publication Number WO 2004/047022 A3

(51) International Patent Classification<sup>7</sup>:

G06T 5/00

(21) International Application Number:

PCT/IB2003/004813

(22) International Filing Date: 28 October 2003 (28.10.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 02079799.9

19 November 2002 (19.11.2002)

(71) Applicant (for all designated States except US): KONIN-KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventors; and

- (75) Inventors/Applicants (for US only): WITTEBROOD, Rimmert, B. NL/NL]; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). DE HAAN, Gerard [NL/NL]; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: GROENENDAAL, Antonius, W., M.; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,

KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Declaration under Rule 4.17:

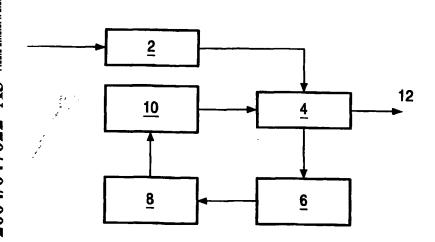
as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

#### Published:

with international search report

[Continued on next page]

(54) Title: IMAGE SEGMENTATION USING TEMPLATE PREDICTION



(57) Abstract: The invention relates to image segmentation using templates and spatial prediction. The templates of neighboring pixels are used for predicting the features of a current pixel. The pixel is assigned to the segments of neighboring pixels according to the deviation of its features from the templates.



- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 29 December 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

			15 03/	704813
A. CLASSII IPC 7	FICATION OF SUBJECT FOR GOODS			
According to	International Patent Classification (IPC) or to both national classifica	tion and IPC		
B. FIELDS	SEARCHED			
Minimum do IPC 7	cumentation searched (classification system followed by classification $G06T$	n symbols)		
	ion searched other than minimum documentation to the extent that su			
	ata base consulted during the International search (name of data bas	e and, where practical	l, search terms used	)
C. DOCUME	ENTS CONSIDERED TO BE RELEVANT			
Category °	Citation of document, with indication, where appropriate, of the rele	vant passages		Relevant to claim No.
X .	WITTEBROOD R B ET AL: "REAL-TIME RECURSIVE MOTION SEGMENTATION OF DATA ON A PROGRAMMABLE DEVICE" IEEE TRANSACTIONS ON CONSUMER ELE IEEE INC. NEW YORK, US, vol. 47, no. 3, 31 August 2001 (2001-08-31), page 559-567, XP002263797 ISSN: 0098-3063 section 3	VIDEO .		1-12
	her documents are listed in the continuation of box C.	Patent family	members are listed i	in annex.
*A* docume consid  *E* earlier of filing of *L* docume which citation  *O* docume other r  *P* docume later th	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention invention  "E" earlier document but published on or after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  "B" document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  "B" document member of the same patent family  Date of the actual completion of the international search		the application but early underlying the claimed invention to considered to cument is taken alone claimed invention ventive step when the one other such docu— us to a person skilled family	
	2 November 2004	Date of mailing of 18/11/2		ися героп
Name and mailing address of the ISA		Authorized officer		
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Bouchaâla, N		

C.(Continuation) DOCUMENTS CONCERED TO BE RELEVANT  Category Citation of document, with indication, where appropriate, of the relevant passages  Relevant to claim No.			
Category	Challon of document, with indication, where appropriate, of the relevant passages	Helevant to claim No.	
X .	HUI ZHANG ET AL: "A new motion estimation algorithm" COMMUNICATIONS, COMPUTERS AND SIGNAL PROCESSING, 1991., IEEE PACIFIC RIM CONFERENCE ON VICTORIA, BC, CANADA 9-10 MAY 1991, NEW YORK, NY, USA, IEEE, US, 9 May 1991 (1991-05-09), pages 619-622, XP010039537 ISBN: 0-87942-638-1 section III	1-12	
X	JAIN A K: "Section 9.13 Image Segmentation" FUNDAMENTALS OF DIGITAL IMAGE PROCESSING, PRENTICE-HALL INTERNATIONAL, INC, US, 1989, pages 407-414, XP002287360 paragraph "Pixel labeling" on page 409 paragraph "Region-Based Approaches" on page 412	1–12	
Α	SHIMA Y ET AL: "A high-speed algorithm for propagation-type labeling based on block sorting of runs in binary images" PROCEEDINGS. 10TH INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION (CAT. NO.90CH2898-5) IEEE COMPUT. SOC. PRESS LOS ALAMITOS, CA, USA, vol. 1, 16 June 1990 (1990-06-16), pages 655-658, XP000166363 ISBN: 0-8186-2062-5 the whole document	1-12	
A	BEVERIDGE J R ET AL: "Segmenting images using localized histograms and region merging" INTERNATIONAL JOURNAL OF COMPUTER VISION NETHERLANDS, vol. 2, no. 3, January 1989 (1989-01), pages 311-347, XP008038606 ISSN: 0920-5691 the whole document	1-12	